UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 Forsyth Street, S.W.
Atlanta, Georgia 30303

MEMORANDUM April 5, 2015

SUBJECT: Review of Vapor Intrusion Risk Assessment
MW-20 AOC Report
Grenada Manufacturing Facility (Site)
Grenada, Mississippi

FROM: Ofia Hodoh
Scientific Support Section
Resource and Scientific Integrity Branch

TO: Brian Bastek, Corrective Action Specialist
Resource Conservation and Restoration Division

THROUGH: Glenn Adams, Chief
Scientific Support Section
Superfund Support Branch

Per your request, I have reviewed the Vapor Intrusion Investigation Risk Assessment, MW-20 AOC Report for the **Grenada Manufacturing Facility (Site)**, located in Grenada, MS. My review has focused on the human health risk aspects of the document as it pertains to vapor intrusion.

Comment to Corrective Action Specialist:
The author briefly discussed the results of the VI risk assessment based on the Johnson-Ettinger (J&E) modeled indoor air for vapor intrusion. Please consult with a Scientific Support Section (SSS) Hydrogeologist to confirm the accuracy of the J&E modeling parameters.

SPECIFIC COMMENTS:

1. **Section 1.1, 3rd paragraph, p. 2.** The author indicated that USEPA's J&E vapor intrusion model is the standard method for evaluating VI risks, citing a 2004 USEPA document that does not exist. Please be advised that USEPA has modified its approach to vapor intrusion and does not recommend modeling as the only line of evidence to screen out a site (USEPA, 2013a; USEPA, 2014e). In general, therefore, it is recommended that collection and evaluation of multiple lines of evidence is needed to support decision-making regarding the VI pathway (USEPA, 2012c).

2. **Section 1.1, 3rd paragraph, p. 2.** The air Regional Screening Levels (RSLs) and Vapor Intrusion Screening Levels (VISLs) for cis-1,2-DCE have been withdrawn from the screening tables therefore, IRIS does not support inhalation RfCs for this chemical (EPA, 2014g).

3. **Section 1.2, 2nd paragraph, p. 3.** This section states that the J&E model was used to determine total VI risks at each probe. This approach is outdated and problematic.
   a) USEPA recommends that soil gas samples are compared to the soil gas VISLs (USEPA, 2014f).
   b) USEPA's VISL calculator is recommended for use in evaluating whether the vapor intrusion pathway has the potential to pose a health concern.
   c) The J&E model does not account for COPCs that act via a mutagenic mode of action (MMOA) thus underestimating risk posed by the vapor intrusion pathway. Consistent with the Superfund guidance on MMOA, methylene chloride and trichloroethylene (TCE) are categorized as chemicals with a MMOA and their cancer risks shall be estimated using age-dependent adjustment factors (ADAFs) (USEPA, 2005a,b).
   d) USEPA has recently updated its Standard Default Exposure Factors (USEPA, 2014c) to reduce variability and uncertainty in the exposure assumptions for human health risk assessments. The averaging time and exposure duration used in the J&E model calculation should be revised to 26 years.

4. **Section 1.3, p.3.** It is indicated that the cumulative cancer risk for the nine probes are below 1E-5, and only one HI slightly exceeded 1. Based on the VISL calculator and modified exposure parameters, SSS noted that four of the nine locations exceeded the 1E-6 risk level (VP-2, VP-3, VP-5 and VP-6); and two locations exceeded the 1E-4 risk level (VP-3 and VP-5). Two locations greatly exceeded an HQ of 1, due mainly to TCE (VP-3 at HQ of 34, and VP-5 at HQ of 160). The VP-2 location slightly exceeded an HQ of 1.

Recommendation: Since TCE is a site-related constituent, a carcinogen, a developmental toxicant and the highest detected probe (VP-5) is less than 100 ft from the nearest house, it does appear that imminent threat may be present. Early action is warranted to determine if vapor intrusion is occurring at the nearby residence.

- ✓ SSS recommends a multiple lines of evidence approach in evaluating and making decisions about risks from vapor intrusion. The recommendations for future analysis at the VP-5 residence should include:

1. Contact the resident to determine if women of reproductive age (or known pregnancy status) live at the residence located near probe VP-5.
2. Concurrently collecting indoor air samples with subslab soil gas or crawlspace air and outdoor (ambient) air. Comparing these results to each other and to results for subsurface vapor sources can foster insights and support findings about the relative contribution of vapor intrusion and 'background' sources to indoor air concentrations.
3. Collect a time-integrated sample in the area directly above the foundation floor (crawl space) and one from the first floor living or occupied area. In general, samples should be collected at the breathing zone level for the most sensitive receptor. The crawl-space subfloor soil gas data (preferably from more than one sampling event to account for seasonal variability) is vital to assess concentrations potentially available for entry with any intruding soil gas.
4. Prior to sampling indoor air in residential buildings, a home survey form should be completed to identify products used or stored within the residence that can act as potential indoor air sources. Examples of building surveys can be found in the EPA's 2002 guidance (Appendix I, USEPA 2002) and ITRC's 2007 guidance (Appendix G, ITRC 2007).
5. Indoor air sampling data (preferably from more than one sampling event to account for seasonal variability) to assess the presence of subsurface contaminants in indoor air and assess potential exposure levels to building occupants.
6. Collect outdoor air samples from a representative upwind location, away from wind obstructions (e.g., trees or buildings), and at a breathing-zone height (3 to 5 feet). A representative sample is one that is not biased toward obvious sources of volatile chemicals (e.g., automobiles, lawn mowers, chemical storage tanks, gasoline stations, industrial facilities, etc.).

If I can be of any further assistance or if you have any questions, please call me at 404 562 9176.

References:

Interstate Technology and Regulatory Council (ITRC). 2007. Vapor Intrusion Pathway: A Practical Guideline. VI-1. Washington, D.C.: Interstate Technology & Regulatory Council, Vapor Intrusion Team. www.itrcweb.org/Documents/VI-1.pdf

U.S. EPA, 2002c. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). Office of Solid Waste and Emergency Response, FR Notice November 29, 2002.

U.S. EPA, 2005a. Guidelines for Carcinogenic Risk Assessment. EPA/630/P-03/001F. March.

U.S. EPA, 2005b. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. Risk Assessment Forum. EPA/630/R-03/003F March 2005. http://epa-prgs.ornl.gov/chemicals/help/documents/CHILDRENS_SUPPLEMENT_FINAL_[1].pdf

U.S. EPA, 2012c. Superfund Vapor Intrusion FAQs. February 2012. http://www.epa.gov/superfund/sites/npl/Vapor_Intrusion_FAQs_Feb2012.pdf

U.S. EPA, 2013a. OSWER Final Guidance For Assessing and Mitigating The Vapor Intrusion Pathway From Subsurface Sources To Indoor Air (External Review Draft). Office of Solid Waste and Emergency Response, April 2013. http://www.epa.gov/oswer/vaporintrusion/documents/vaporIntrusion-final-guidance-20130411-reviewdraft.pdf

U.S. EPA, 2014c. OSWER Memo, Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER Directive 9200.1-120, February 6, 2014. http://www.epa.gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9200-1-120-ExposureFactors.pdf

U.S. EPA, 2014e. EPA's Vapor Intrusion Website. Last updated on Wednesday, June 6, 2014. www.epa.gov/oswer/vaporintrusion/

U.S. EPA, 2014f. OSWER Vapor Intrusion Assessment, Vapor Intrusion Screening Levels, Version 3.3.1, June 2014, found at EPA's Vapor Intrusion Website, www.epa.gov/oswer/vaporintrusion/

EPA, 2014g. Integrated Risk and Information System, National Center for Environmental Assessment, Office of Research & Development, USEPA. http://www.epa.gov/ncea/iris/
(updates added periodically).